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BACTERIOLOGICAL QUALITY OF ICE CREAM MARKETED IN ANKARA

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Ankara'da Tüketime Sunulan Dondurmaların Bakteriyolojik Kalitesi

Özet : *Ankara'da tüketime sunulan dondurmaların bakteriyolojik kalitesini belirlemek amacıyla gerçekleştirilen bu çalışmada, 46 adet dondurma örneği incelenmiştir. Dondurma örneklerinin yedisinden fekal koli (%15.2), ikisinden (%4.3) Staphylococcus aureus izole edilmiştir. S.aureus, koliform ve toplam mezofilik aerobik bakteri sayıları dikkate alındığında, dondurma örneklerinden 15'inin (%32.6) bakteriyolojik yönden dondurma standartlarına uygun olmadığı görülmüştür.*

Anahtar kelimeler : *Dondurma, bakteriyolojik kalite*

Summary : *In this study, 46 samples of ice cream purchased from different markets in Ankara were examined for bacteriological quality. Staphylococcus aureus and fecal coliforms were isolated from two (4.3%) and seven (15.2%) of 46 samples, respectively. According to the total counts of aerobic bacteria, coliforms and S.aureus obtained, it was determined that 32.6% of ice-cream samples examined were not fit bacteriologically to the Turkish ice-cream standarts.*

Key words : *Ice-cream, bacteriological quality.*

Introduction

Ice cream is a frozen dairy food made by freezing a pasteurized mix. The mix is composed of combination of milk products (milk, condensed milk, milk powder cream), sugar, emulsifiers, stabilizers and flavouring and coloring agents (4,5,9,17)

Ice cream is a palatable, nutritive and healthful food. Therefore, ice cream production has increased rapidly in recent years in many countries of world. In Turkey, the production of ice cream is made in two different ways. These are the traditional methods and the industrial production. The traditional production method refers to the manufactoring of open/artisanal (pastry shop's) ice cream. Kahramanmaraş type ice cream, a popular one in Turkey, can also be included in this group. The manufactoring of this kind of ice cream in generally made in small-scaled production units like pastry shop's. They do not follow a standardized procedure for manufacture of ice cream. Conversely to the traditional method, the industrial ice cream is

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produced in a hygienic conditions at modern plants. These kind of modern factories produce ice cream in a great variety of shapes, flavors and flavor combinations. Also their marketing nets are huge. Therefore, industrial ice cream production has been increasing rapidly in Turkey.

Microorganisms cannot grow in ice cream since the temperatures remain below -10 °C. However, ice cream can become contaminated by ingredients those are added post pasteurization and by improper sanitation of equipment and the environment. Therefore, the presence of microorganisms in these products can give information about the raw ingredient quality and the sanitary nature of processing and packaging (16). Hence, there are some surveys on the bacteriological quality of ice cream and related products (6,8,10,11,12,15). Their results also showed that ice cream and related products can become contaminated by *S.aureus* and coliforms.

Besides, owing to the differents methods adopted in ice cream production, their bacterial quality may vary a great deal. Therefore a study on the bacteriological quality of market ice cream would be of great importance.

Material and Methods

Materials : In this study, fourty-six samples of market ice cream collected from 18 different localities of Ankara were used. These included 27 open/artisanal ice cream and 19 packed/industrial ice cream samples. The samples were collected in an ice box and taken directly to the laboratory where they were examined for bacteriological quality immediately.

Methods : Total bacteria, coliforms and fecal coliforms counts were determined by the methods described in Anon 1992 (3). Detection of *S.aureus* was examined by the methods of Anon 1989 (1). In addition, Salmonella was determined according to Anon 1991 (2).

Results and Discussion

Data obtained from the ice cream samples are presented in Table 1. As shown in Table, the counts of total bacteria of ice cream samples ranged from $1.3x10^1$ cfu/g (sampels 1 and 43) to $2.1x10^6$ cfu/g (sample 11). These results indicated that samples 1,2,11 and 24 had the higher count of total bacteria than $1x10^5$ cfu/g which is the legal limit (3). Also, 7 samples (samples 1,3,11,12,19,20 and 25) had fecal coliforms exceeding the 0 cfu/g legal limit (3). *S.aureus* was isolated from two samples (samples 3 and 8) but none of samples had salmonella. According to the total count of aerobic bacteria, coliforms and *S.aureus* obtained, it was determined that 32.6% of ice cream samples examined were not fit bacteriologically to the Turkish ice cream standard. However all of the samples of factory made(packed/industrial) ice cream were fit bacteriologically to the Turkish ice cream standarts (3).

The results obtained from experimental ice cream clearly indicate that the pastry shops' (open/artisanal) ice cream samples are more contaminated by coliforms, *S.aureus* and other aerobic bacteria than the others'. The results are generally similar by other authers' (7,10,12,13,14,15).

The study shows the substandard microbiological quality of open/artisanal ice cream, that is in a way justifies and confirms the natural shift of consumers to packed/industrial ice cream with consistently good quality. The study calls for action in two fold:

* Production permissions for artisanal ice cream manufacture should be given only after a proper inspection against set standards. Periodical controls should be conducted to serve to the same purpose.

* Consumer should be made aware regarding the hygienic quality and consistency of other quality parameters of industrial ice cream.

Table 1. Bacteriological quality of ice cream marketed in Ankara

Tablo 1. Ankara'da tüketime sunulan dondurmaların bakteriyolojik kalitesi

Samples No*	Total bacteria (cfu/g)	Coliforms (cfu/g)	Fecal Coliforms	S.aureus	Salmonella spp.
1	1.2×10^5	150	+	-	-
2	1.8×10^5	23	-	-	-
3	2.0×10^4	11	+	+	-
4	1.0×10^4	120	-	-	-
5	5.1×10^3	-	-	-	-
6	2.3×10^2	-	-	-	-
7	6.7×10^3	150	-	-	-
8	9.2×10^2	210	-	+	-
9	3.9×10^3	120	-	-	-
10	2.0×10^4	23	-	-	-
11	2.1×10^6	460	+	-	-
12	3.9×10^4	240	+	-	-
13	1.7×10^3	120	-	-	-
14	2.2×10^4	-	-	-	-
15	9.1×10^3	93	-	-	-
16	7.6×10^4	-	-	-	-
17	4.4×10^3	-	-	-	-
18	8.1×10^3	-	-	-	-
19	2.0×10^2	23	+	-	-
20	3.7×10^3	150	+	-	-
21	4.8×10^2	93	-	-	-
22	1.8×10^4	210	-	-	-
23	4.7×10^3	93	-	-	-
24	1.1×10^5	460	-	-	-
25	2.3×10^4	43	+	-	-
26	1.6×10^4	73	-	-	-
27	4.9×10^3	-	-	-	-
28	2.1×10^2	-	-	-	-
29	1.1×10^4	93	-	-	-
30	1.7×10^1	-	-	-	-
31	1.3×10^2	-	-	-	-
32	6.2×10^2	-	-	-	-
33	8.2×10^1	-	-	-	-
34	1.0×10^2	-	-	-	-
35	4.5×10^3	-	-	-	-
36	6.4×10^2	-	-	-	-
37	3.4×10^2	-	-	-	-
38	2.8×10^1	-	-	-	-
39	9.5×10^2	-	-	-	-
40	7.4×10^2	-	-	-	-
41	1.3×10^1	-	-	-	-
42	6.1×10^2	-	-	-	-
43	1.3×10^1	-	-	-	-
44	2.2×10^1	-	-	-	-
45	1.0×10^2	-	-	-	-
46	4.9×10^1	-	-	-	-

* : 1-27 open/artisanal ice cream; 28-46 packed/industrial ice cream

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